

WORKSHOP INTRODUCTION

Landsat Data Continuity Mission

BACKGROUND:

The Landsat program began with the launch of the Earth Resource Technology Satellite (ERTS, later renamed Landsat 1) on July 23, 1972, was followed by Landsats 2, 3, 4, and 5, all launched by the National Aeronautics and Space Administration (NASA). Instrumentation evolved from the Return-Beam Vidicons and Multispectral Scanners flown on early Landsats to the Thematic Mappers flown on Landsats 4 and 5. In 1985, Landsats 4 and 5 were commercialized. These satellites, their data rights, and data distribution became the responsibility of the Earth Observation Satellite Company, EOSAT. Landsat scenes cost approximately \$4400 each during EOSAT's tenure. EOSAT constructed Landsat 6 with government funding but declined to invest in future missions.

To ensure data continuity, Congress passed the Land Remote Sensing Policy Act of 1992 (Public Law 102-555). It restored the Landsat program to the Government with the launch of Landsat 7 and commissioned Landsat 7 to supersede Landsat 6 (the need for Landsat 7 became urgent when Landsat 6 failed to reach orbit on October 5, 1993). This public law also defined the data price as "cost of fulfilling a user request" to all customers with non-discriminatory access for all, committed the United States to ensuring the continuity of Landsat coverage into the 21st century, and requested a technology demonstration program. The technology demonstration program took the form of NASA's EO-1 mission, which was launched in November 2000 and described at a workshop immediately following this one.

The Land Remote Sensing Policy Act also requested an assessment of options for a successor to Landsat 7. These options include a program funded and managed by (1) the private sector, (2) a government-private sector cooperative effort, (3) the US Government, and (4) an international consortium. Preference was given to the first option.

Originally, Landsat 7 was a joint but short-lived NASA-Department of Defense endeavor. On October 16, 2000 a revision to a 1994 Presidential Decision Directive was issued which realigned NASA and the Department of the Interior/United States Geological Survey (USGS) as partners in Landsat Program Management. Concurrently, NASA turned over the responsibility for operating Landsat 7 to the USGS.

In answering the request for an assessment of options for a Landsat 7 successor, NASA and the USGS issued a jointly formulated Request for Information (RFI) in the summer of 1999. It was intended to determine industry's interest in a commercial purchase of Landsat-type data. It also sought insight

into industry's technical and procurement approaches and rough order-of-magnitude costs. Responses to the RFI were reviewed by a team from NASA, the USGS, and academia, and the results were presented to the NASA Associate Administrator for Earth Science and to the USGS Director. No respondent stated that Landsat-type (30/15 meter) data had an economically viable commercial market. Indeed, no one disclosed plans to develop a commercial Landsat-type mission. However, most respondents did favor a contractor-owned-and-operated space and ground system. They also suggested innovative procurement options, with many potential vendors suggesting pre-paying for part of all of the data to reduce life-cycle costs. After examining the variety of responses and noting the different understandings of what a data buy meant, it became clear that a dialogue between vendors, customers and other members of the Landsat community would be constructive and beneficial to all. In part, this workshop grew out of that observation.

PROCUREMENT APPROACH:

The approach to obtaining the successor to Landsat-7 has evolved into what is being called the "Landsat Data Continuity Mission," or LDCM. The name is a bit ungainly, but it was deliberately chosen. The continued acquisition of Landsat-type data is the driving force - as spelled out in the public law. Hence, "continuity" is important. The word "data" was inserted because the Government is concerned with the end product, and does not intend to define or manufacture the means of getting it. A "Landsat 8" or "Landsat Continuity Mission" would give the impression that it was business as usual at NASA. Rather, having already built 6 of 7 Landsats and funded them all, the Government wants to challenge industry to come up with more cost-effective ways of obtaining data.

The LDCM is being framed around a specification for data of Landsat quality. The data itself will be the principal deliverable under this contract, to be procured using a Request for Procurement (RFP). The delivery of these data should start circa 2005-2006. The Government desires to share mission costs, risks, and rewards with the private sector. Note that an RFP precludes the Government's proposing, either by itself or as a partner with industry or academia, on this contract. However, the Government may provide progress payments with proper safeguards and conditions. It may also make available goods and services open to any and all proposers. For example, such goods may include relevant new technologies developed by the Government and demonstrated on the EO-1 satellite, and such services may include acquiring data by using the USGS EROS Data Center (EDC) ground station.

Data providers may use any reasonable means of producing the data, but NASA must validate the approach (how the vendor plans to do it and that the system should produce the specified data), the implementation (that the vendor is following the plan and that the manufactured system performs as expected), and the data itself. This insight is necessary since NASA and the USGS are

responsible to both the customers using the data and to taxpayers. Traditionally, NASA's role has been that of oversight, not insight, and NASA will be relinquishing some of the control it has had in the past.

Respondents must propose data rights (this topic is under discussion) and associated costs. Further, the proposers must present a business plan that substantiates their expected cost sharing – the Government does not want to provide all of the funding, and business risks associated with cost sharing must be understood. A business plan likely to collapse halfway to launch is clearly unacceptable.

This approach is amenable to all four LDCM options listed in the public law.

In short, the Government desires to make a smart procurement that meets its needs while giving maximum flexibility to the data provider. The Government wishes to bring other customers, potential vendors, and the public into the formulation of this mission through the posting of information on the Internet (at <http://ldcm.usgs.gov>) for comment and through hosting open workshops and/or conferences.

THIS WORKSHOP:

The primary purposes of this workshop were to discuss the draft data specification, to discuss potential commercial opportunities, and to obtain feedback from the entire Landsat community. Major items of concern in the specification were discussed, but it was not intended to review the specification line-by-line. Issues were identified, discussed, and understood, if not yet resolved. The Government was there primarily in a listening mode.

This workshop was structured around a series of panels from the science community, data provider community, data user community, and data distributor/value-added reseller community. A final open forum provided for discussions of miscellaneous topics. Panelists had 10 minutes each to present their views (guided by suggested questions), followed by 30 minutes of open discussions between the audience and panel members. In keeping with the open nature of this workshop, business plans and proprietary information were not discussed.

To fulfill the plan for putting a summary of this workshop on the LDCM web site, panel chairs were asked to reconvene their members immediately after the meeting and to prepare a brief report of their thoughts and observations. Further, a stenographer prepared an overall summary (not a verbatim transcript) of the workshop, and panelists who had electronic presentations were asked to provide them for posting on the web site. The results of this effort are what follow this introduction.

CLOSING COMMENTS:

In closing this introduction, we would like to answer the charge that the LDCM data specification is really a point design, as well as answer some other questions that have been raised.

Question: If I can find a ride on a spacecraft going my way, can I put my instrument on it?

Answer: Sure. So long as the data delivered to the Government demonstrably meets the data specification, how you obtain it is your business.

Question: Can I add other instruments to the spacecraft and sell the data I get from them?

Answer: Yes. The Government will contract only for the data that meets the Government's data specification; what you do with any other data is your business.

Question: Could I fly a hyperspectral instrument, combine data from appropriate spectral channels for the Government's needs, and sell the higher resolution data?

Answer: Yes - as long as the data delivered to the Government meets the Government's data specification, what you do with any other data is your business.

Question: Could I fly an instrument with better spatial resolution, combine pixels to get 30-meter data, and sell the higher-resolution data?

Answer: Yes - as long as the data delivered to the Government meets the Government's data specification, what you do with any other data is your business.

Question: Could I fly a fleet of spacecraft, obtain data every 2 to 4 days, deliver the once-every-16-day data to the government and sell the rest?

Answer: Yes. The Government will contract only for the data that meets the Government's data specification; what you do with any other data is your business.

The pattern should be evident; the Government has claim only for the data it will have under contract. What the vendor does with any other data (or space on the spacecraft, etc.) is the vendor's business. This flexibility is intended to allow for mission cost-sharing via various means and, ultimately, allow for lowering the cost of the data that the Government wants - which brings us to this workshop.

